

## CLAIMS

What is claimed is:

- 5 1. A method for mesh restoration for an optical network with a plurality of nodes and a plurality of links, comprising steps of:
  - defining a set of attributes for said links;
  - calculating a backup path for each working path between a first node and a
  - second node in said network, wherein said backup path is SRLG-disjoint from said
  - 10 working path;
  - activating a backup path for a working path in response to a fault along said
  - working path;
  - adjusting said attributes for the links along said backup path;
  - disseminating fault information to said nodes in said optical network.
- 15 2. The method according to claim 1 wherein said attributes include attributes which will be disseminated globally to all said nodes in the network.
3. The method according to claim 1 further comprising another set of attributes which
- 20 will be kept locally by one of the end points of said link.
4. The method according to claim 1 wherein said step of disseminating fault information is via OSPF.
- 25 5. The method according to claim 2, wherein said set of attributes further includes a first subset of attributes which will be disseminated in low frequency.
6. The method according to claim 2, wherein said set of attributes further includes a first subset of attributes which will be disseminated in high frequency.
- 30 7. The method of claim 5, wherein the subset of attributes includes total bandwidth.

8. The method of claim 5, wherein the subset of attributes includes SRLG– Shared Risk Link Group which is defined as a set of links sharing a common physical resource.
9. The method of claim 6, wherein the subset of attributes includes bandwidth allocated to the working path.
10. The method of claim 6, wherein the subset of attributes includes bandwidth reserved to the backup path.
11. The method of claim 6, wherein the subset of attributes includes weighted SRLG.
12. The method of claim 3, wherein the set of attributes includes a resource reservation table wherein each entry further including a resource ID and paths reserving said resource.
13. The method of claim 12, wherein the resource ID is time slot ID.
14. The method of claim 12, wherein the resource ID is wavelength ID.
15. The method of claim 12, wherein the paths include both working path and backup path.
16. A method for determining diversely routed paths for a mesh optical network with a plurality of nodes and a plurality of links with a plurality of attributes, comprising steps of:
  - identifying a first node and a second node in response to a request for establishing a path with a required bandwidth between said first and said second node;
  - finding a first set of links by deleting from the interconnection graph links with a first of said attributes less than said required bandwidth;
  - finding a first optimal path between said first and second node from said first set of links;

finding a second set of links by further deleting from the interconnection graph the links sharing a second of said attributes with any one of the links along said first optimal path;

assigning a value to said second set of links;

5 finding a second optimal path between said first and said second node from said second set of links based on said assigned value;

adjusting said first and second attributes for each link along said second optimal path.

10 17. The method according to claim 16 wherein said first optimal path is the working path.

18. The method according to claim 16 wherein said first optimal path is the backup path.

15 19. The method according to claim 16 wherein said first attribute is residual bandwidth which is defined as total bandwidth of a link minus bandwidth allocated for working paths and backup paths.

20. The method according to claim 16 wherein said second attribute is SRLG.

20 21. A method for fault recovery for a mesh optical network with a plurality of OXC nodes, comprising steps of:

detecting the fault in a working path;

starting recovery process from tail end OXC of said path, which further includes:

25 identifying reserved resource;

passing fault information to the egress port of said OXC;

passing said fault information to upstream node;

configuring said OXC;

30 22. The method according to claim 21 wherein said step of detecting the fault is via SONET/SDH signal failure.

23. The method according to claim 21 wherein said fault information is propagated via SONET/SDH overhead bytes.

24. The method according to claim 21 wherein said fault information includes a path ID.

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25. The method according to claim 21 wherein said step of passing fault information to the egress port is via an inter-card communication mechanism.

SYCS-060/P105/KL-06